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V. *A Supplement to the Measures of Trees, printed in the Philosophical Transactions for 1759.* By Robert Marsham, Esq. F. R. S.

Read December 22, 1796.

THESE measures were all taken by myself, except the second, of the ash in Scotland; and that I believe is fair. As that is the largest ash, and as thriving as any I had seen, I was desirous to procure a second measure of it. The measures (where there was no impediment) were taken at five feet from the earth, as the easiest height to run the line even, and a fair height for the bulk of the body. For most trees (at least oaks and chesnuts) are frequently found to be one-third more in circumference at one foot than at five. Where I have measures of more than one tree of the same kind, I give the largest and a smaller, to show the different proportion of the increase of their different sizes: and as trees standing single generally increase more than those in groves, I mark them with an S. and a G. as the difference is more than would be expected by those that think little of trees.

In 1719 I had about two acres sowed with acorns, and from 1729 to 1770 I planted oaks from this grove, always leaving the best plants standing for the future grove: but most of the transplanted trees are already larger than those that were not removed; the largest of which is now (1795) but five feet

6 inches 8 tenths in circumference; and the largest transplanted tree (which was planted in 1735) is 8 ft. 8 in. 7 tenths, viz. near 38 inches gained by transplanting in 60 years. And in beeches from seed, in 1733, the largest is now (1795) but 6 feet 9 inches; and the largest transplanted beech is 7 feet 5 inches 1 tenth, viz. 8 inches larger, although the transplanted beech is eight years younger than that from the seed. This proves that it is better to plant a grove, than to raise one from the seed. The expence of planting is inconsiderable, and the planted trees are full as good and handsome; and many years are saved, beside the extra growth of planted trees. But this extra growth will not prove near so great in groves as in single trees. The first grove I planted from these acorns of 1719, was in 1731. In 1732 I made another grove from them; and in 1735 I planted a third grove from them; and in 1753 the last considerable number of plants were taken from the grove, and these are very good trees: so 34 years may be saved. But I would by no means advise the planting trees so large, as the trouble and expence will be too much, unless where a shelter or screen is wanted.

Whether a grove is to be raised from seeds, or planted, it is advisable to shelter it round; if from the seed, with such sorts as will grow quicker; and if by planting, with larger and taller trees. The soil in Norfolk is unfavourable to elms; therefore in planting I will venture to recommend hornbeams, as they may be planted large trees. I planted some hornbeams (rather large) in 1757, and disliking their situation, in 1792 I removed them when they were about three feet in circumference, and did not lose one tree; and they made shoots of

near half a yard that year; but I ought to say I cut off their heads.

Before I quit this subject, I will presume to recommend, if young oaks are unthriving, there is reason to hope they may be helped by cutting them down to a foot or six inches: for in 1750 I planted some oaks from my grove of 1719 into a poorer soil, and although they lived, they were sickly; so in 1761 I cut most of them down to one foot, and then by cutting off the side shoots, in three or four years led them into a single stem, and most of them are now thriving and handsome trees; and you can hardly see where they were cut off, and some are four feet round; and I have used the same method with unhealthy chesnuts, beech, hornbeam, and wych elm, and with the same success.

R. MARSHAM.

Stratton, May 29, 1796.

The aggregate Increase in Circumference of different Trees,
divided into tenths of Inches of their annual Growth.

	Dates.	Fect.	Inches. 10ths of In.	Fect.	Inches. 10ths of In.	Years.	10ths of In.
S. Oak, in the Holt Forest, by the Lodge	1759	34	0 2 +				
	1778	34	0 7 +				$\frac{5}{36}$
S. Oak, in Stratton, planted in 1580, at 4 feet	1760	15	2 9				
	1781	16	5 8	1	2 9	21	- + 7
S. Oak, planted by me, in 1720	1742	2	11 2				
	1781	8	2 6	5	3 4	39	- 16 $\frac{1}{4}$
S. Oak, acorn in 1719, and transplanted 1735	1756	3	6 0				
	1781	7	2 2	3	8 2	25	about 17 $\frac{2}{3}$
S. Wych elm, in Stratton Hollow, at 4 feet	1760	29	5 6				
	1780	29	10 0	0	4 4	20	- 2 $\frac{1}{3}$
S. Wych elm, by Bradly church, Suffolk	1754	25	5 4				
	1765	26	0 6	0	7 2	11	- 6 $\frac{1}{2}$
G. Wych elm, in Stratton	1787	3	9 0				
	1795	4	6 0	0	9 0	8	- + 11
S. Ash, in Benel ch. yd. N. of Dunbarton, Scotland	1768	16	9 0				
	1783	18	0 0	1	3 0	15	- 10
S. Ash, in Stratton, planted after 1647	1742	9	10 5				
	1782	12	11 2	3	0 7	40	- + 9
S. Ash, planted in 1725, in very poor land	1769	5	5 0				
	1781	6	6 1	1	1 1	12	near 11
S. Chesnut, in Christ Church Park, by Ipswich	1747	15	8 5				
	1763	16	11 2	1	2 7	16	- + 9
S. Chesnut, in Hevingham, Norfolk, planted 1610	1742	12	7 0				
	1781	14	11 2	2	4 2	39	near 7 $\frac{1}{4}$
S. Beech, in Christ Church Park, by Ipswich	1755	15	7 5				
	1763	15	10 6	0	3 1	8	near 4
S. Beech, in Stratton, seed 1741, washed and dried	1778	3	7 4				
	1781	4	4 4	0	9 0	3	- 30
G. Beech, same age	1785	3	10 5				
	1795	5	1 5	1	3 0	10	- 15
S. Plane, in Shottisham, Norfolk	1755	3	10 3				
	1774	7	9 2	3	10 9	19	- + 24 $\frac{2}{3}$
S. Poplar, black, set in my father's time	1756	11	5 0				
	1768	12	2 4	0	9 4	12	near 8
S. Poplar, black, in Horstead, Norfolk	1750	6	1 0				
	1754	7	4 0	1	3 0	4	- 37 $\frac{1}{2}$
S. Poplar, white Abele	1760	0	7 0				
	1781	4	3 5	3	8 5	21	- + 21

	Dates.	Fect.	Inches.	10ths of In.	Fect.	Inches.	10ths of In.	Years.	10ths of In.
S. Willow - - - - -	1756	5	0	0					
	1765	6	4	2	1	4	2	9	- 18
G. Alder, in sandy soil - - - - -	1759	2	0	4					
	1776	3	4	7	1	4	3	17	- + 9 $\frac{1}{2}$
S. Asp - - - - -	1772	2	8	7					
	1781	4	2	0	1	5	3	9	- + 19
G. Mountain ash - - - - -	1759	2	2	7					
	1781	4	2	4	1	11	7	22	- + 10 $\frac{3}{4}$
G. Birch - - - - -	1759	2	10	4					
	1768	3	6	2	0	7	8	9	- 8 $\frac{2}{3}$
G. Horsechesnut - - - - -	1758	1	4	4					
	1779	3	0	2	1	7	8	21	near 9 $\frac{1}{2}$
G. Lime, in sandy soil - - - - -	1777	3	2	5					
	1783	3	9	0	0	6	5	6	near 11
G. Cedar, one foot high in 1748 - - -	1777	3	1	6					
	1795	6	1	5	2	11	9	18	almost 20
G. Silver fir, planted in 1746 - - - -	1758	1	6	5					
	1781	4	10	6	3	4	1	23	near 18
G. Scotch fir, planted in 1735 - - - -	1756	4	1	5					
	1781	6	8	0	2	6	5	25	- 12 $\frac{1}{5}$
G. Spruce fir, planted 1735 - - - - -	1756	3	4	9					
	1781	5	2	0	1	9	1	25	near 8 $\frac{1}{2}$
S. Weymouth pine, planted in 1747 - -	1756	1	4	1					
	1781	4	8	5	3	4	4	25	- + 16
G. Pinaster, planted in 1738 - - - - -	1756	4	0	7					
	1762	4	11	5	0	10	8	6	- 16
G. Larch, planted in 1749 - - - - -	1758	1	5	2					
	1781	4	2	5	2	9	3	23	near 14 $\frac{1}{2}$
S. Holly, from seed, by me, and transplanted	1749	1	10	4					
	1781	3	9	1	1	10	7	32	- + 7
S. Hawthorn, by Hethel church, Norfolk, at 4 ft.	1755	9	1	0					
	1781	9	8	5	0	7	5	26	near 3